

Chapter 14

Transportation

This chapter analyzes the impacts of the proposed alternatives on traffic and transportation facilities. Methodology is discussed in the *Transportation Technical Report*, Appendix M.

14.1 Existing Conditions

The traffic and transportation study area includes the Upper and Lower Sites (approximately 693 acres) and the local roadways connecting the sites, including Interstate 90 (I-90) from Exit 32 through Exit 38. Figure 14-1 illustrates the geographic boundaries of the study area and roadways considered in this analysis. The study area includes the following interchanges, roadways, and highways in the vicinity of the proposed mining operation sites:

- Exit 38 (West Homestead Valley Road Interchange)
- Exit 38 (East Garcia Interchange)
- Exit 34 (at 468th Avenue SE or Edgewick Road Interchange)
- Exit 32 (at 436th Avenue SE)
- SE North Bend Way between 468th Avenue SE (Exit 34) and 436th Avenue SE (Exit 32)
- SE 140th Street between 468th Avenue SE and SE North Bend Way
- SE 146th Street (east of 468th Avenue SE)
- 468th Avenue SE (SE 140th Street to I-90 (Exit 34))
- I-90 between Exit 32 and Exit 38 (East)
- SE Grouse Ridge Road (to Exit 38 East)

14.1.1 Highway and Street Systems

The City of North Bend is about 30 miles east of Seattle, Washington. The main transportation corridors are I-90, which provides access to the east and west, and SR 202, which provides access to the neighboring cities of Snoqualmie and Redmond. Bus (transit) service is provided by Metro, a division of King County, to Seattle and other communities in the Snoqualmie Valley.

Principal arterials in the vicinity of the project are SE North Bend Way from west of 436th Avenue SE to 468th Avenue SE, and 436th Avenue SE from SE North Bend Way to I-90 (see Figure 14-1). Table 14-1 lists major streets in the study area that could be affected by the proposed project.

**Table 14-1
Existing Roadway Characteristics**

Location	Road Type	Average Lane Width (feet)	Average Shoulder Width (feet)	Pavement Type	Sidewalk
SE North Bend Way, West of 436th Avenue SE	Two-lane	10.5	8	Asphalt	No
SE North Bend Way, East of 436th Avenue SE	Two-lane	10.5	5.5	Asphalt	No
436th Avenue SE, North of I-90 WB Ramps	Two-lane	11	8	Asphalt	No
436th Avenue SE, South of I-90 EB Ramps	Two-lane	11	10	Asphalt	No
SE Middle Fork Road, East of 468th Avenue SE	Two-lane	11.5	7	Asphalt	No
468th Avenue SE, North of SE 144th Street	Two-lane	11.5	4	Asphalt	No
SE 144th Street, East of 468th Avenue SE	Two-lane	13	0	Gravel & Dirt	No
468th Avenue SE, SE 144th Street to I-90 Ramps	Two-lane	14	6	Asphalt	Some
SE 146th Street, East of 468th Avenue SE	Two-lane	12	8	Asphalt	Yes (8 feet)
SE North Bend Way, West of 468th Avenue SE	Two-lane	12.5	3	Asphalt	No
I-90 WB On-Ramp at 468th Avenue SE (Exit 34)	Ramp	15	5.5	Asphalt	No
I-90 WB Off-Ramp at 468th Avenue SE (Exit 34)	Ramp	18	8.5	Asphalt	No
Between I-90 Ramps at 468th Avenue SE	Two-lane	13	7.5	Asphalt	No
I-90 EB Off-Ramp at 468th Avenue SE (Exit 34)	Ramp	16	11.5	Asphalt	No
I-90 EB On-Ramp at 468th Avenue SE (Exit 34)	Ramp	21	5	Asphalt	No
468th Avenue SE, South of I-90 EB Ramps	Two-lane	11	10	Asphalt	No
SE Homestead Valley Road, West of Exit 38 West	Two-lane	14	0	Asphalt	No
SE Homestead Valley Road at Olallie Entrance	Two-lane	12	Varies	Asphalt	No
SE Grouse Ridge Road, East of Bridge	One-lane	14	0	Asphalt	No

WB = westbound, EB = eastbound

14.1.1.1 Lower Site Access

Figure 14-2 shows streets and businesses in the vicinity of the Lower Site. The proposed project access for the Lower Site on SE 146th Street is paved for approximately 850 feet from 468th Avenue SE east and has 8-foot-wide sidewalks on both sides. Edgewick Inn has two drives on the south side of SE 146th Street and the BP/Pizza Hut/Taco Bell complex has one drive on the north side close to 468th Avenue SE.

468th Avenue SE is a 2-lane road with some shoulders of varying width but no turn lanes. It is bordered by a sidewalk on the east side only from SE 146th Street north to SE 144th Street. North of SE 144th Street, 468th Avenue SE curves west and the speed limit slows from 35 miles per hour (mph) to 25 mph. In this area, the road has little or no shoulder, with trees and fences along its edges. Streetlights exist only at isolated intersections. Along 468th Avenue SE there are fire hydrants along the east side and no parking signs on the west side. An open ditch is in front of part of Seattle East Auto Truck Plaza (formerly Ken's Truck Town) on the west side. Trucks exiting the Seattle East Auto Truck Plaza and turning southbound onto 468th Avenue SE cross over into the northbound lane. Development along the road is mostly commercial south of SE 144th Street to SE North Bend Way and light industrial north of SE 144th Street.

SE Middle Fork Road tees into 468th Avenue SE as 468th Avenue SE heads north and west. Just to the east of the tee along the north side of SE Middle Fork Road is the site of the proposed middle and elementary schools (see Figure 14-2). At the tee heading west, 468th Avenue SE becomes SE 140th Street (a 35-mph road with gravel shoulders or no shoulders) that serves a residential area before connecting to SE North Bend Way. Local truck traffic was observed on SE 140th Street.

SE North Bend Way is a high-speed (50 mph) arterial that starts at 468th Avenue SE and heads west into central North Bend. This truck route is two lanes wide with paved 6-foot shoulders. It serves a commercial, office, industrial, and residential property. Speed limits gradually decrease to 25 mph as the road enters the city of North Bend. 468th Avenue SE to the south connects SE North Bend Way to I-90 at Exit 34 (see Figure 14-1).

14.1.1.2 Upper Site Access

SE Grouse Ridge Road is a private road that varies in lane and shoulder widths. The gated roadway was built for and serves the Washington State Patrol Fire Training Academy. Most of the 20-mph road is paved, with a single 14-foot lane intertwined with a few blind curves.

The Washington State Department of Natural Resources (WDNR) owns SE Grouse Ridge Road north and west of the bridge over the South Fork of the Snoqualmie River. The Washington State Patrol now owns the bridge, which, along with the road, was built in 1983. From the bridge south to the gate (approximately 1/4 mile), the roadway is owned by Washington State Parks. The single-lane bridge, 137 feet long and 16 feet wide, is posted at a 36-ton weight limit and can carry up to 54-ton trucks (maximum load). The Fire Training Academy staff maintains the entire 2.5-mile roadway (from the gate to the Academy entrance), including snow removal during the winter.

A utility easement runs along the length of SE Grouse Ridge Road from I-90 up to the Fire Training Academy, then down a Weyerhaeuser logging road and 468th Avenue SE and into North Bend. The easement includes two underground fiber-optic cables (one AT&T and one MCI/WorldCom), a Puget Power line, and a PTI telephone line. A third parallel fiber-optic cable will be built soon down the middle of SE Grouse Ridge Road.

The Fire Training Academy has 14 full-time employees and many part-time employees and students. The Academy is open and operating from 8 a.m. to 5 p.m. five days a week from December through February, and seven days a week from March through November. The road gate typically opens at 6 a.m. and closes at 5:30 p.m. Traffic is usually up the hill by 9 a.m. and starts leaving at 3:30 p.m.

SE Homestead Valley Road, the connecting roadway between east and west Exit 38 of I-90, is former State Route 10, a two-lane facility in fair condition with mostly paved shoulders. A portion of the roadway needs

an overlay and widening for paved shoulders at and east of the Olallie State Park entrance. The asphalt concrete overlay is frequently cracked and slightly rutted in the traffic lanes, with occasional transverse reflective cracks from the underlying Portland cement concrete panels. Some of the Portland cement concrete pavement panels are cracked, although the panel joints are tight. This stretch of roadway, approximately 1/4 mile, also has two narrow 20-foot-long bridges, with one bridge 26 feet wide and the other 36 feet wide. Pedestrians and bicyclists travel along this route, especially near the entrance to the state park. West of the park, the speed limit is 50 mph.

14.1.1.3 Interstate 90

Truck traffic generated by the proposed Action Alternatives would exit the Lower or Upper Sites and enter I-90 at Exits 34 and/or 38. East of North Bend, I-90 is a high-speed, 70-mph highway heading to the summit at Snoqualmie Pass. It is four lanes wide eastbound and three lanes wide westbound between Exit 34 and Exit 38. In 1998, approximately 26,000 vehicles per day (VPD) used I-90 near Exit 32, 27,000 VPD used I-90 near Exit 34, and 26,000 VPD used I-90 near Exit 38, according to the Washington State Department of Transportation (WSDOT). The Seattle East Auto Truck Plaza at Exit 34 is the first major truck service facility off of I-90, on the west side of Snoqualmie Pass. The truck stop serves all traffic, particularly interstate truck traffic and stopped eastbound traffic when I-90 is closed east of North Bend.

14.1.1.4 Proposed Development and Improvements

Eleven development projects in the vicinity of the Lower Site have been submitted for permit or reviewed at a pre-application meeting with King County. Eight projects would result in 137 single-family residential units; two projects are churches; and one project is an educational facility. Only the residential projects are expected to generate AM or PM peak hour trips that would disperse to many roadways in the site vicinity. Therefore, the increase in traffic on any single roadway is expected to be small. The additional trips generated by proposed developments in the area were accounted for in the future growth rate used for analyses.

Additional development projects discussed during the public scoping process for this EIS were not included in the pipeline project list at the time it was received. These include the proposed middle and future elementary schools on SE Middle Fork Road east of 468th Avenue SE, and the SE 144th Street industrial park/warehouse distribution center north of the proposed site. Recently, the industrial park/warehouse permit has received approval and is currently under construction.

The Snoqualmie Valley School District has purchased properties on SE Middle Fork Road on which the District proposes to construct an elementary school with an anticipated enrollment of 550 students and a middle school with an anticipated enrollment of 600 students. At this

time, the school district has not conducted an environmental review of either of either of the schools and no building permits have been applied for with King County. The volumes for the two future school projects have been incorporated into the EIS traffic analysis even though the schools themselves currently are speculative in nature. The schools are expected to be completed by 2005.

The future weekday peak-hour traffic volumes for the schools and industrial park were estimated using trip generation rates from the Institute of Transportation Engineer's *Trip Generation Manual* and are shown in Table 14-2.

**Table 14-2
Trip Generation for 2005 Projects**

Future Weekday Trip Generation			(Total/In/Out)		
Land Use	Unit		ADT ^a	AM Peak Total	PM Peak Total
Elementary School (520)	550	Students	562/281/281	165/96/69	143/66/77
Middle School (522)	600	Students	870/435/435	270/154/116	174/89/85
Warehouse (150)	134,000	square feet	844/422/422	101/83/18	92/22/70
Office (710)	32,400	square feet	558/279/279	76/67/9	116/20/96
Totals			2,833/1,417/1,417	612/400/212	525/197/328

^a Average Daily Trips

The peak hour trips were distributed and added to the background traffic for 2005. The added trips were then projected to increase at the same rate as other background traffic for the years 2015 and 2025 No Action analyses.

King County has listed seven potential transportation improvement projects in the study area. Three are improvements to existing bridges, and the other four are long-range projects listed in the County's *Transportation Needs Report* as "low priorities." Low priority projects may never be constructed; therefore, the potential effects of these projects were not considered in this study.

North Bend has listed several projects in the City of North Bend Transportation Element of the Comprehensive Plan (1995). None of the projects listed are located within the project area.

14.1.2 Traffic Volumes

14.1.2.1 Existing Volumes

Intersection traffic counts in the study area were collected in September 1998 by Heffron Transportation, and in March through April 1999 and in February 2001 by URS (see Table 14-3) at 13 locations in the study area. The Heffron Transportation counts were performed during the week prior to the Labor Day weekend and represent one of the highest traffic volume

periods of the year. The traffic volumes for Wednesday and Thursday were averaged. Friday volumes were excluded from this analysis because it preceded the Labor Day weekend and, therefore, represents a high holiday volume condition that occurs only a few times per year. The URS counts were averaged for the 3-day period in 1999. Vehicle turn movements were observed during morning and evening peak periods (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.). The February 2001 counts were conducted during a 5-day period, Wednesday through Sunday and reconfirmed previous traffic volumes, including the assumption that weekend traffic was less than weekday traffic.

Table 14-3
Traffic Data Collection Locations

Intersection		September 1998	March through April 1999	February 2001
EXIT 32	436th Avenue SE - SE North Bend Way		X	
	436th Avenue SE - I-90 WB Ramps		X	
	436th Avenue SE - I-90 EB Ramps		X	
EXIT 34	468th Avenue SE -140th Street & Middle Fork Road		X	
	468th Avenue SE -SE 146th Street	X		X
	468th Avenue SE - SE North Bend Way	X	X	X
	468th Avenue SE - I-90 WB Ramps	X		X
	468th Avenue SE - I-90 EB Ramps	X		X
EXIT 38	Homestead Valley Road - I-90 WB On-Ramp		X	
	Homestead Valley Road - I-90 EB Off-Ramp		X	
	Homestead Valley Road - I-90 WB Off-Ramp		X	
	Homestead Valley Road - I-90 EB On-Ramp		X	
	Homestead Valley Road - Park Access Road		X	

WB = westbound, EB = eastbound

In 1998, 26,000 vehicles per day (VPD), on average, used I-90 east of North Bend. According to WSDOT's *1997 Annual Traffic Report* (WSDOT, 1997), traffic volumes on I-90 in this sector of King County are lower than average in September and in March/April. The peak traffic month for this section of King County and I-90 is July. Seasonal traffic variations are normal, and standard engineering practices provide a means of accounting for them. To ensure that the analysis considered a worst-case scenario (such as highest traffic volumes), an adjustment factor of 17 percent was applied to the September data and 45 percent to March and April data to account for seasonal traffic variations. The result yields traffic volumes equal with those that would be expected in the summer peak period. Figure 3 (Exit 32), Figure 4 (Exit 34), and Figure 5 (Exit 38) in the *Transportation Technical Report* show the 1999 peak daily weekday traffic volumes in the study area for the existing conditions (Appendix M).

14.1.2.2 Future Volumes

The annual traffic growth rates for I-90 and the various roadways within the project area of unincorporated King County were established by comparing the 1998 and 1999 traffic counts, as adjusted, against available traffic data from I-90 for 1994, 1995, 1996, and 1997. Background (not project-related) auto traffic is assumed to increase by 2.5 percent per year and truck traffic by 1.5 percent per year.

The background traffic growth rate was applied to current (1999) traffic data to determine the future traffic baseline in order to evaluate the proposed project alternatives. The traffic generated from the elementary and middle schools, as well as the industrial/office space was added to the projected traffic volumes for the year 2005. This volume became the new baseline. The traffic projections for years 2015 and 2025 were then projected using the 2.5 percent and 1.5 percent per year growth rates for automobiles and trucks respectively, including the schools and office/industrial volumes. These years provide a basis to evaluate how traffic operations would change during the life of the proposed mine, and provide information related to the likely timing for potential transportation improvements. The peak hour volumes for the No Action scenarios in the future (2005, 2015, and 2025) are shown on Figures 6, 7, and 8 of the *Transportation Technical Report* (Appendix M).

14.1.3 Level of Service (LOS)

14.1.3.1 Methodology

LOS is a measure of the quality of traffic flow. It is rated from A to F, with A representing the best (free flow) conditions and F representing the worst. The 2000 edition of the *Highway Capacity Manual* (HCM) measures LOS at street intersections in terms of control delay per vehicle in seconds. Control delay is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The control delay also includes the time required to decelerate to a stop and to accelerate to the free-flow speed (FFS). The LOS grades are described in more detail below.

- LOS A describes primarily free-flow operations at average travel speeds, usually about 90 percent of the FFS for the given street class. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal. Control delay is ≤ 10 seconds.
- LOS B describes reasonably unimpeded operations at average travel speeds, usually about 70 percent of the FFS for the street class. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant. Control delay is >10 to 20 seconds (>10 to 15 seconds for unsignalized intersections).

- LOS C describes stable operations. However, a driver's ability to maneuver and change lanes in mid-block locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50 percent of the FFS for the street class. Control delay is >20 to 35 seconds (>15 to 25 seconds for unsignalized intersections).
- LOS D borders on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40 percent of FFS. Control delay is >35 to 55 seconds (>25 to 35 seconds for unsignalized intersections).
- LOS E is characterized by significant delays and average travel speeds of 33 percent or less of the FFS. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing. Control delay is >55 to 80 seconds (>35 to 50 seconds for unsignalized intersections).
- LOS F is characterized by urban street flow at extremely low speeds, typically 1/3 to 1/4 of the FFS. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing. Control delay is >80 seconds (>50 seconds for unsignalized intersection).

Peak hour LOS determinations at the selected intersections were made according to the methodology described in the 2000 edition of the *Highway Capacity Manual* using Highway Capacity Software 2000 (HCS2000) version 4.1 software. Special adjustments were made for "heavy trucks" with three or more axles to account for their differences in operation characteristics from passenger cars. The *Highway Capacity Manual* and the software consider the average heavy truck as equivalent to two passenger cars on flat grades, and much greater on uphill grades (varying with the grade). All adjustment tables for effect of grades are keyed to this "default" heavy truck.

Vehicle classification count machines were placed along 436th Avenue SE (Exit 32), 468th Avenue SE (Exit 34), and SE Homestead Valley Road during the September 1998 traffic count period, and at two of these same locations during the March through April 1999 count period. This equipment determines truck types by number of axles. The average heavy truck using the I-90 exits has 4.1 axles, and the average heavy truck along I-90 has 4.4 axles. The average heavy truck using these routes is considered equivalent to the "default" heavy truck described in the preceding paragraph.

Trucks much larger than the default truck would service the project site (see Figures 14-3 and 14-4). The number of axles per truck would range from 6 to 8.

To assess the impacts of these trucks in highway capacity/operations analyses, the number of project-generated truck trips was doubled to account for trucks coming in empty and leaving full, effectively increasing the “percentage of heavy vehicle” entries overall. The project haul truck is therefore represented as equivalent to four passenger cars (one empty, one full and then increased by a factor of two per the Highway Capacity Manual resulting in four Passenger Car Equivalents (PCE) used in the calculations) on flat grades, and up to eight PCEs (due to factors contained in the Highway Capacity Manual) on rolling terrain such as SE Grouse Ridge Road. These calculations result in a worst case scenario for the number of trucks during the peak hour calculations. Several of the loads will actually only require a one-way trip as they either originate on the site or have the site as a destination.

14.1.3.2 Peak Hour Analysis

The AM and PM peak commuter hours were selected for LOS analyses. The AM peak hour is from 7 a.m. to 8 a.m., and the PM peak hour is from 4:30 p.m. to 5:30 p.m.

Existing peak hour volumes, which are used to calculate worst-case intersection LOS and delays, are shown on Figure 14-5. Table 14-4 shows total movement delays, queue length, and LOS for the existing AM and PM peak hour conditions.

Table 14-4
Existing Peak-Hour Level of Service Summary

Intersection	AM Peak Hour			PM Peak Hour		
	LOS ^a	Delay ^b	95% Q ^c	LOS	Delay	95% Q
SE North Bend Way/436th Ave SE						
NB Left & Right	C	23.7	6	F	128.8	26.0
WB Left & Through	A	7.9	1	A	8.6	1
I-90 WB Ramps/436th Ave SE						
WB Left & Through	F	77.0	1	E	38.9	1
WB Right	B	11.1	1	B	11.6	1
NB Left	B	10.2	3	A	9.6	1
I-90 EB Ramps/436th Ave SE						
EB Left & Through	C	24.3	1	E	42.4	5
EB Right	A	9.1	1	E	39.3	13
SB Left	B	10.3	1	A	8.5	1
Middle Fork Road/468th Avenue SE						
WB Left & Right	A	9.3	1	A	9.4	1
SB Left & Through	A	7.4	1	A	7.6	1
SE 146th Street/468th Avenue SE						
EB Left, Through & Right	A	9.7	1	B	10.3	1
WB Left, Through & Right	B	11.3	1	B	13.5	1
NB Left, Through & Right	A	8.4	1	A	8.7	1
SB Left, Through & Right	A	7.4	1	A	7.5	1

Table 14-4 (Continued)
Existing Peak-Hour Level of Service Summary

Intersection	AM Peak Hour			PM Peak Hour		
	LOS ^a	Delay ^b	95% Q ^c	LOS	Delay	95% Q
SE North Bend Way/468th Ave SE						
EB Left & Right	B	10.7	1	B	11.5	1
NB Left & Through	A	8.0	1	A	7.8	1
I-90 WB Ramps/468th Ave SE						
WB Left, Through & Right	A	9.9	1	B	10.7	1
NB Left & Through	A	7.6	1	A	7.8	1
I-90 EB Ramps/468th Ave SE						
EB Left, Through & Right	B	10.5	1	C	16.4	2
SB Left & Through	A	7.9	1	A	8.1	1

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds.

^c 95% Q = 95th percentile queue estimate in vehicles.

NB = northbound, WB = westbound, EB = eastbound, SB = southbound

Note: Only Critical Movements shown. Those movements without stop control have free-flow through intersection and are not represented here.

All movements at intersections along 468th Avenue SE (Exit 34) operate at LOS B or better under existing conditions for both the AM and PM peak hours, with the exception of the eastbound movements at 468th Avenue SE and I-90 EB ramps which operates at LOS C in the PM peak hour. However, intersections along 436th Avenue SE (Exit 32) have at least one driving “movement” (left turn, right turn, or through) that operates at LOS E or worse in either the AM or PM peak hour. Higher volumes at unsignalized intersections cause such traffic flows.

Existing intersections at SE Homestead Valley Road (Exit 38) are underutilized and operate at LOS A (see Appendix M).

14.1.3.3 Mitigation Peak Hour Analysis

In addition to the Highway Capacity Manual intersection analysis and the corresponding HCS2000, an additional traffic analysis was performed. VISSIM is a traffic analysis software that simulates how traffic will operate through an entire system of intersections and is capable of visually displaying the outcome. The purpose of the VISSIM analysis is to help determine the most appropriate mitigation measures based on the impacts of the Proposal (Alternative 2).

The VISSIM analysis was performed only for the Proposal (Alternative 2) and only within the direct impact areas of the Proposal. Therefore, intersections along 468th Avenue SE between the I-90 eastbound ramps and SE 146th Street were analyzed. Results of the HCS analysis and the VISSIM analysis are compared in Tables 14-6, 14-7, 14-9, 14-10, 14-19, 14-20, 14-21, and 14-22.

Several different mitigation scenarios were analyzed using VISSIM to help determine the most beneficial mitigation for the transportation system with respect to the Proposal. As a baseline, the 2005 and 2025 forecast

years were modeled without the project. Then the 2005 and 2025 forecast years were modeled including the traffic generated by the project. Finally, differing levels of mitigation, ranging from adding lanes to adding signals, were modeled to evaluate mitigation options. The results of the VISSIM analysis are presented in sections 14.2 Environmental Impacts and 14.3 Mitigation Measures.

14.1.4 Accident History

Accident data from King County for 1992 to 1999 shows 12 accidents at intersections on 468th Avenue SE and 14 accidents at intersections on SE North Bend Way, as listed below.

- SE 140th Street and 468th Avenue SE, two accidents
- SE 146th Street and 468th Avenue SE, one accident
- SE Middle Fork Road and 468th Avenue SE, two accidents
- SE North Bend Way and 468th Avenue SE, one accident
- SE 144th Street and 468th Avenue SE, two accidents
- SE 160th Street and 468th Avenue SE, one accident
- SE 153rd Street and 468th Avenue SE, three accidents
- SE North Bend Way and SE 140th Street, four accidents
- SE North Bend Way and 452nd Avenue SE, two accidents
- SE North Bend Way and 455th Avenue SE, eight accidents

WSDOT provided information for I-90 at the two interchanges within the study area (I-90 at 435th Avenue SE and I-90 at 468th Avenue SE) for January 1, 1998 through December 31, 2000. For I-90 at 436th Avenue SE, there were 12 accidents reported for this period (two in 1998, seven in 1999 and three in 2000) totaling eight injuries and no fatalities. For the intersection of I-90 and 468th Avenue SE, a total of 19 accidents were reported for the same period (eight accidents in 1998, 10 accidents in 1999, and five in 2000) totaling 19 injuries and one fatality. The accident resulting in the fatality (occurring in 1998) also accounted for five injuries.

14.2 Pedestrian and Bicycle Facilities

Sidewalks in the study area exist only along SE 146th Street and part of the east side of 468th Avenue SE between SE 144th Street and SE 146th Street. Pedestrian and bicycle travel currently occurs on the shoulders of 468th Avenue SE. Shoulder width is adequate in some locations and inadequate in others, making pedestrian and bicycle travel hazardous. Provisions for bicycle and pedestrian travel along SE Homestead Valley Road near Olallie State Park is adequate except where shoulders do not exist. Wide, soft shoulders and off-road trails allow pedestrians to travel along most of SE Homestead Valley Road. Due to the low volume of

vehicles and bicyclists, bicycle travel along SE Homestead Valley Road is not a major safety concern.

No sidewalks or bicycle lanes are programmed within King County Transportation Plans for the proposed project area. Sidewalks may be provided with new development.

14.2.1 School Transportation

Currently, three bus routes make a combined 11 daily trips on 468th Avenue SE to service students of the Snoqualmie Valley School District. With the construction of the proposed new elementary and middle schools (projected to be completed in 2004), additional buses and routes will be added as necessary. Projections for these two schools were based on average trips made, given the proposed size of the school converted to automobiles and projected to increase at a 2.5 percent per year growth rate to obtain a worse case scenario of traffic in and around the proposed school area.

Information provided by the Snoqualmie Valley School District indicates that prior to the development of bus routes for the proposed schools, a safety analysis must be performed. The School District is bound to bus children that would be required to walk a mile or more to school. An evaluation of existing land use within the study area and within a 1-mile radius of the proposed elementary and middle school sites shows two residential areas within that radius. Children living in residences along SE North Bend Way might be required to walk within the project area between SE North Bend Way and SE 146th Street along 468th Avenue SE. The second area within the one-mile radius is south of I-90 along SE 150th Street and SE 153rd Street. A small portion of the community falls within the one-mile radius. Considering the fact that many of the children south of I-90 would require busing and that walking through an interstate interchange area would be required for the other children, it is unlikely that the school district would require any of the children who live south of the interstate to walk to school.

14.2.2 Interstate 90 Closures

In the winter, when I-90 is closed for avalanche control near Snoqualmie Pass, the 468th Avenue SE exit (Exit 34) experiences higher than normal traffic volumes. In particular, truck volumes in the area increase because many eastbound trucks pull off the highway to take advantage of the amenities at Seattle East Auto Truck Plaza while they wait for the pass to re-open. During pass closures, local citizens report that 468th Avenue SE becomes practically impassible.

WSDOT provided I-90 closure data for previous winters. During an average winter, Snoqualmie Pass is closed approximately 40 times (see Table 14-5). Figure 14-6 shows the number of closures for the winters of 1995 through 1998 by various durations. Most of the closures were relatively brief, lasting less than 1 hour. Extended closures occur much

less frequently. All of the closures that were longer than 48 hours occurred in early 1997.

Table 14-5
Weather-Related Closures of Eastbound I-90
(1995 to 1998)

Location of Closure	Number of Closures			Total Duration of Closures (hours)		
	1995-96	1996-97	1997-98	1995-96	1996-97	1997-98
Milepost on I-90						
MP 38	5	10	4	91	647	16
MP 47 and Eastward	8	26	15	38	716	57
Total Eastbound	13	36	19	125	1,363	73

Source: WSDOT Hyak Communications Center.

According to WSDOT, the winter of 1998 to 1999 was the worst on record in western Washington. During this season, Snoqualmie Pass was closed 55 times. More than 50 percent of the closures lasted less than 1 hour. Eighty-five percent of the closures lasted less than 3 hours, most of which occurred in the early morning hours.

Due to circulation improvements implemented by Seattle East Auto Truck Plaza, the severity of traffic congestion attributable to truck traffic during I-90 closures has been reduced.

14.2.3 Traffic Operation

With the additional truck traffic from the proposed project, the potential would exist for more conflicts and accidents with other vehicles.

14.2.3.1 Traffic Operation Impact

This traffic analysis was performed using vehicle-classification counts (see Table 14-3) performed at many locations along 468th Avenue SE, including the ramps to I-90 and at SE North Bend Way in 1998 and 1999. The traffic volumes derived from these counts were used to determine the existing traffic operating conditions in the area, as well as future traffic operations without the project. Project-generated traffic volumes, derived for the concurrent analysis, were used to determine how the proposed project would affect existing traffic operations. Also evaluated were two potential roadway improvements to determine how each could benefit traffic operations and when various components of each improvement are needed. This analysis is preliminary and was performed to help formulate a mitigation strategy for the project.

14.2.3.2 Truck Impacts on Road Maintenance

Heavy trucks have a significant impact on the design and maintenance of road surface and subsurface structures. The major streets serving I-90 interchanges, including I-90, the I-90 ramps, 468th Avenue SE, SE North Bend Way, and SE Homestead Valley Road, are truck routes. These

streets are classified to support the heavy vehicles. The additional truck weight fees that are paid annually as part of truck licensing support road maintenance for these roads. The haul trucks shown in Figures 14-3 and 14-4 would fit well within allowable axle-load allowances; they average 13,000 to 14,000 pounds per axle. Additional permit requirements may also apply to the project haul route operations and loading on existing bridges.

A pavement evaluation of SE Homestead Valley Road conducted in 2001 shows that pavements are generally inadequate for the anticipated traffic loads of Alternatives 3 and 4 (see Attachment B to Appendix M). Pavement distress is evident throughout most of the road alignment. The estimated remaining life of the existing pavement is about 10 to 15 years with proper repairs and maintenance.

Surface water along the truck routes in the proposed project vicinity is currently well managed with drainage ditches and culverts, except for short segments. Ponded water in these areas should be drained away from the road subgrades.

The full life expectancy of all the roadway pavement sections depends on future roadway maintenance, past and future traffic volumes, and the strength and stiffness of existing subgrades and pavements. Because evaluations of the existing pavements were based on visual observations and a review of construction records, the conclusions and recommendations presented in this report should be considered general in nature pending future in-depth testing.

14.3 Environmental Impacts

14.3.1 Construction Impacts

14.3.1.1 Alternative 1—No Action

The No Action alternative would have no significant construction impacts. Logging trucks from timber harvesting activities would temporarily increase traffic.

14.3.1.2 Alternative 2—Proposal: Lower and Upper Sites Mining (Including Limited Lower Site Mining)

Development of the Lower Site's processing plant operations and access road/intersection improvements would generate temporary construction traffic. During construction, heavy construction truck traffic would be far less than the truck trips estimated during the site's peak operation. However, construction may involve a number of oversized equipment hauls. These would occur by permit under conditions set by King County.

Construction impacts under Alternative 2 would be minimal because some of the Lower Site is already cleared and graded and only minimal additional earth moving would be required. Slight increases in vehicle emissions can be expected from the additional trucks and cars of the construction contractor and from traffic slowing due to work in construction zones on existing roadways. Traffic along 468th Avenue SE from SE 146th Street to SE North Bend Way could be disrupted at times or even stopped totally if the roadway is widened and improved.

14.3.1.3 Alternative 3—Lower and Upper Sites Mining (Including Limited Lower Site Mining)

Under Alternative 3, construction impacts in the area of the Lower Site, including along 468th Avenue SE, would be similar to those listed under Alternative 2. On the Upper Site, the traffic to and from the Fire Training Academy could be disrupted at times or even stopped totally when SE Grouse Ridge Road is widened and realigned. (It is likely that the roadway would be temporarily closed during improvements). Safety improvements along SE Homestead Valley Road would also disrupt traffic. In addition, construction trucks and equipment would use SE Homestead Valley and SE Grouse Ridge Road to get to the site.

14.3.1.4 Alternative 4—Upper Site Mining - Exit 38

Under Alternative 4, construction impacts in the area of the Upper Site, including along SE Homestead Valley Road, would be similar to those listed under Alternative 3 for the site and road. On the Upper Site, traffic construction impacts would also be the same as listed under Alternative 3.

14.3.2 Operation Impacts

Operational impacts were analyzed using two different methods. The two models used are VISSIM and HCS2000. HCS2000 is an industry standard and the most up-to-date versions of the software have been used throughout the development of the EIS. VISSIM provides a broader picture of traffic operations and was included in the analysis to help determine the most appropriate mitigation measures. However, both models generate similar output with respect to LOS, delay, and queuing so the results of both are presented for comparison purposes.

VISSIM and the HCS2000 provide two entirely different methods for traffic analysis. VISSIM is a stochastic, time step and behavior based microscopic simulation model that keeps track of the vehicle characteristics (i.e., vehicle location, speed, acceleration/deceleration) of every individual vehicle in the model at every simulation time step. VISSIM provides output based on individual vehicle characteristics in the model and accounts for the effects of vehicle interaction throughout the simulation model in its output at a single intersection. The HCS2000 method of analysis is deterministic and provides algorithms to analyze traffic characteristics. The HCS2000 does not account in its output at a

single intersection for vehicle interaction between all vehicles at all other intersections in a roadway system consisting of multiple intersections.

Due to the fact that the models use different methods to determine the desired output, results vary, and in some cases the results vary dramatically. However, both models show the trends similarly that can be expected in future year operations.

14.3.2.1 Alternative 1–No Action

Traffic generated under Alternative 1 is built into the existing conditions analysis discussed earlier. The following analysis shows traffic projections for future years with No Action.

Table 14-6 and Table 14-7 show the projected AM and PM peak-hour intersection LOS and total movement delays for the No Action Alternative for the three study years (2005, 2015, and 2025).

Table 14-6
No Action AM Peak-Hour Level of Service Summary

Intersection	2005		2005 VISSIM		2015		2025		2025 VISSIM	
	LOS ^a	Delay ^b	LOS ^a	Delay ^c	LOS ^a	Delay ^b	LOS ^a	Delay ^b	LOS ^a	Delay ^c
SE North Bend Way/436th Ave SE										
NB Left & Right	E	46.6			F	631.5	F	>1,000		
WB Left & Through	A	8.1			A	8.4	A	8.8		
I-90 WB Ramps/436th Ave SE										
WB Left & Through	F	138.2			F	956.8	F	>1,000		
WB Right	B	11.8			B	13.4	C	16.2		
NB Left	B	11.6			C	18.2	F	190.2		
I-90 EB Ramps/468th Ave SE										
EB Left & Through	D	32.4			F	82.4	F	420		
EB Right	A	9.2			A	9.6	B	10.1		
SB Left	B	11.1			B	13.1	C	17.1		
Middle Fork Road/468th Avenue SE										
WB Left & Right	B	15.0			C	23.8	F	197.4		
SB Left & Through	A	8.0			A	8.2	A	8.7		
SE 146th Street/468th Avenue SE										
EB Left, Through & Right	B	11.4	A	9.7	B	13.1	C	16.6	B	14.1
WB Left, Through & Right	C	17.0	C	18.1	C	22.8	E	37.4	E	46.0
NB Left, Through & Right	A	8.9	A	2.3	A	9.2	A	9.6	A	5.5
SB Left, Through & Right	A	7.9	A	0.3	A	8.2	A	8.5	A	0.5
SE North Bend Way/468th Ave SE										
EB Left & Right	B	14.8	C	18.9	C	19.4	D	33.1	F	173.2
NB Left & Through	A	8.4	A	2.4	A	8.6	A	9.0	B	14.2
I-90 WB Ramps/468th Ave SE										
WB Left, Through & Right	B	12.0	A	9.9	B	13.5	C	16.3	D	30.4
NB Left & Through	A	7.9	A	0.7	A	8.1	A	8.4	A	7.2
I-90 EB Ramps/468th Ave SE										
EB Left, Through & Right	B	13.9	A	7.6	C	18.6	E	40.0	B	10.3
SB Left & Through	A	8.0	B	12.0	A	8.1	A	8.3	C	19.7

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds calculated by HCS2000.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculation

NB = northbound, WB = westbound, EB = eastbound, SB = southbound

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

**Table 14-7
No Action PM Peak-Hour Level of Service Summary**

Intersection	2005		2005 VISSIM		2015		2025		2025 VISSIM	
	LOS ^a	Delay ^b	LOS ^a	Delay ^c	LOS ^a	Delay ^b	LOS ^a	Delay ^b	LOS ^a	Delay ^c
SE North Bend Way/436th Ave SE										
NB Left & Right	F	637.1			F	>1,000	F	>1,000		
WB Left & Through	A	8.9			A	9.7	B	10.9		
I-90 WB Ramps/436th Ave SE										
WB Left & Through	F	62.8			F	358.6	F	>1,000		
WB Right	B	12.5			B	14.9	C	19.7		
NB Left	B	10.3			B	12.5	C	19.0		
I-90 EB Ramps/436th Ave SE										
EB Left & Through	F	139.4			F	>1,000	F	>1,000		
EB Right	F	198.8			F	>1,000	F	>1,000		
SB Left	A	8.7			A	9.4	B	10.4		
Middle Fork Road/468th Avenue SE										
WB Left & Right	B	13.8			C	19.4	F	59.9		
SB Left & Through	A	8.1			A	8.5	A	9.1		
SE 146th Street/468th Avenue SE										
EB Left, Through & Right	B	13.5	C	20.1	C	17.3	D	27.9	C	20.3
WB Left, Through & Right	C	22.6	F	54.7	E	36.0	F	99.6	F	314.2
NB Left, Through & Right	A	9.9	A	9.4	B	10.7	B	12.1	D	28.3
SB Left, Through & Right	A	7.8	A	0.5	A	8.0	A	8.2	A	0.9
SE North Bend Way/468th Ave SE										
EB Left & Right	C	17.7	C	24.7	D	28.4	F	158.1	F	1,061.8
NB Left & Through	A	8.6	A	9.8	A	9.1	A	9.8	F	66.5
I-90 WB Ramps/468th Ave SE										
WB Left, Through & Right	B	12.3	B	12.2	B	14.3	C	18.9	F	198.4
NB Left & Through	A	8.5	A	4.3	A	9.0	A	9.7	F	210.8
I-90 EB Ramps/468th Ave SE										
EB Left, Through & Right	D	29.0	C	16.3	F	156.9	F	>1,000	F	658.8
SB Left & Through	A	8.3	B	14.4	A	8.5	A	8.8	C	23.6

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds calculated by HCS2000.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

NB = northbound, WB = westbound, EB = eastbound, SB = southbound

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

All three unsignalized intersections along 436th Avenue SE (Exit 32) would have movements that operate at LOS D/E/F by 2005 during the AM and PM peak hour. Additional movements would operate at LOS F in 2015, and this LOS would continue in 2025.

Users of 436th Avenue SE (Exit 32) would experience very long delays, in both the AM and PM peak hours, on the minor movements in future years due to heavy usage. Signalized intersections would eliminate long delays on the minor movements and improve LOS.

All movements at the intersections along 468th Avenue SE (Exit 34) would continue to operate at LOS C or better under the No-Action alternative during the AM peak hour, through 2015. For the 2025 projection, the westbound left/right movement at Middle Fork Road, the westbound left/through/right movement at SE 146th Street, the eastbound left/right movement at SE North Bend Way and the eastbound left/through/right movement at the I-90 eastbound ramps operate at LOS D, E, or F. During the PM peak hour, the westbound left/through/right movement at SE 146th Street will operate at LOS E (2015) and LOS F (2025), the eastbound left/right movement will operate at LOS D (2015) and F (2025), and the eastbound left/through/right movement at the I-90 eastbound ramp intersection is expected to operate at LOS F by 2015. Movements at the intersections at Middle Fork Road, SE 146th Street, and SE North Bend Way are projected to operate at LOS F by 2025. Without signalization or intersection improvements, long delays will begin occurring by 2015.

Exit 38 intersections would experience little delay due to the low number of vehicles. Future traffic would include logging trucks used during timber harvesting on the Upper Site. Ramp intersections currently operate at LOS A and would continue to do so through 2025.

Congestion

Traffic occasionally queues along 468th Avenue SE between I-90 and SE 144th Street during the AM and PM peak hours. Intersection LOS analysis indicates that there is adequate capacity in this corridor to accommodate the traffic demand through 2005. By 2015 the intersections along this corridor will start becoming “saturated” and traffic congestion will occur. The growth in background traffic and the additional traffic generated by the new elementary school, middle school, and industrial park will contribute to this congestion.

Most congestion is related to large trucks entering the Seattle East Auto Truck Plaza from 468th Avenue SE at SE 146th Street, which would also be the entrance intersection into the Lower Site. Queuing does occur if trucks arrive consecutively to enter the Seattle East Auto Truck Plaza or use the Pacific Pride commercial fueling bays. The driveway capacity is two to four trucks (depending on the truck lengths) or approximately 200 feet. When capacity is reached, the trucks queue onto northbound 468th Avenue SE. The existing one-lane configuration on 468th Avenue SE does not permit northbound or right-turning vehicles to pass the queued trucks waiting to turn into Seattle East Auto Truck Plaza. However, vehicles do pass on the shoulder, thus causing potential safety problems.

A traffic modeling (VISSIM) analysis of this queuing was developed (see Attachment A to Appendix M) for both the AM and PM peak for the No Action scenario in 2005 and 2025. The traffic queue lengths (in feet) are noted in Tables 14-19, 14-20, 14-21, and 14-22. NOTE: This analysis

only modeled the traffic on 468th Avenue SE and its intersections within the study area.

14.3.2.2 Alternative 2–Proposal: Lower and Upper Sites Mining (Including Limited Lower Site Mining)

Trip Generation

Trip generation for the Proposal developed by Heffron Transportation is included in Appendix A of this FEIS as “North Bend Trip Generation Worksheet,” dated May 10, 1999. The work sheet assumes that, initially, the Lower Site would be used to supply direct sales of unprocessed materials to customers and other Cadman, Inc. facilities. In the future, as market conditions allow, a concrete plant and/or an asphalt plant could be built on the Lower Site. At its peak, the site is expected to produce up to 2.1 million tons of gravel, 100,000 cubic yards of concrete, and 150,000 tons of asphalt each year. Maximum production volume during the peak construction month typically represents approximately 15 percent of the annual production. The site would employ approximately 20 people at full production, not including truck drivers.

Trip Rates

Other assumptions made in the Heffron worksheet with respect to project trips are summarized in this section. Daily truck-trip generation rates for the proposed project were derived using the average hauling capacity of various types of trucks that are anticipated to serve the site for sand and gravel (aggregate), concrete, and asphalt transport. The trip generation rates assume that two trips are generated for each load of material moved (one trip entering, and one trip exiting). AM and PM peak-hour truck-trip generation rates and employee trip generation rates were derived using 3 days of traffic count data from a similar Cadman, Inc. site in Snohomish County. The counts performed at the Snohomish County site determined that 10.5 percent of the truck trips occur during the AM peak hour, and 1.7 percent of the truck trips occur during the PM peak hour. It was assumed that all of the concrete and asphalt trucks and only a small percentage of the gravel trucks would be stored on the site overnight. Independent contractors own most of the gravel trucks, and would not store their trucks on the site overnight. Truck trips may occur later than the PM peak hour if nighttime construction occurs. However, most construction projects and truck drivers tend to avoid the commuter peak hours, so it is not likely that nighttime activity would increase the site’s PM peak-hour traffic.

Truck traffic is calculated at 360 loads per day of aggregate, 78 loads of concrete, and 30 loads of asphalt under Alternative 2.

Figure 14-7 shows traffic movement to/from I-90 and SE 146th Street. Vehicles include trucks (aggregates, concrete, and asphalt) and passenger cars. Table 14-8 shows the number and type of vehicles as well as their direction (inbound or outbound from the site) that would be

generated by the Proposal for an average day during the peak of the construction season. The AM and PM percent split as well as the inbound/outbound percent split were derived from 3 days of traffic count data from a similar Cadman, Inc. site in Snohomish County. The calculation assumes that 15 percent of the annual production would occur during the peak month, with 24 production days during that month. An average day during the peak month represents approximately 0.6 percent of the annual production. Four intersections along 468th Avenue SE would experience slightly higher delays by the addition of project-generated vehicles.

**Table 14-8
Alternative 2 Project Trip Generation (Proposal)**

	Daily Trips (One-way)	AM Peak Hour Trips			PM Peak Hour Trips		
		In	Out	Total	In	Out	Total
Aggregate for Resupply	568	24	36	60	6	4	10
Aggregate for Delivery	152	6	10	16	2	1	3
Aggregate for Batch Plants ^a	0	0	0	0	0	0	0
Concrete	156	0	16	16	3	0	3
Asphalt	60	0	6	6	1	0	1
Total Truck Trips	936	30	68	98	12	5	17
Passenger Vehicle Trips	62	4	1	5	1	7	8
Total Trips	998	34	69	103	13	12	25

^a Conveyor delivers aggregate for batch plants from top of Grouse Ridge.

Table 14-8 shows that the Proposal would generate 998 trips per day during the peak month. No truck trips are included for delivery of aggregate for use in batch plants as this would be delivered by conveyor from the upper site to the lower site. Trip generation is not included for Alternative 2A, as this would generate fewer total trips. During the PM peak hour, the site would generate 25 trips a day during the peak month, or approximately one trip every 2 minutes.

Trip Distribution Pattern and Assignment

Project-generated trips would arrive and leave the project site via I-90 to Exit 34 (468th Avenue SE) to SE 146th Street. All project-generated trips would use this route, with the exception of some employee trips and those supplying occasional local projects. This is the most direct and safest route and would keep heavy trucks off local streets. The trucks would be directed not to use SE North Bend Way and, by using I-90, could not bypass the weight station.

The Proposal would result in vehicle trips to/from the site by an estimated 20 site-based employees on an average weekday. Estimates of average weekday site-based employee trips range from 60 to 65.

Future Volumes

Traffic volumes generated by the Proposal were added to estimated 2005 traffic volumes to show how traffic volumes would fluctuate by time of day. Figure 14-8 shows the volumes by hour and by type of vehicle. Future volumes from the Proposal can be derived for all three study years by adding the project-generated volumes (see Figure 14-7) to the Alternative 1 (No Action) forecasted volumes (see Figures 6 through 8 in Appendix M).

Level of Service

Projected AM and PM peak-hour LOS and delays under Alternative 2 are presented in Tables 14-9 and 14-10, respectively. Table 14-11 and Table 14-12 compare the LOS between Alternative 1 (No Action), and Alternative 2 (Proposal). Alternative 2 would not impact I-90 Exit 32.

A VISSIM analysis of traffic delay and queuing under Alternative 2 was developed (see Attachment A in Appendix M) for both the AM and PM peak hours for the projected years of 2005, 2015, and 2025. The VISSIM delay is shown in Tables 14-9 and 14-10 below.

Table 14-9
Alternative 2 AM Peak-Hour Level of Service Summary

Intersection	2005		2005 VISSIM		2015		2025		2025 VISSIM	
	LOS ^a	Delay ^b	LOS ^a	Delay ^c	LOS ^a	Delay ^b	LOS ^a	Delay ^b	LOS ^a	Delay ^c
SE 146th Street/468th Avenue SE										
EB Left, Through & Right	B	11.5	B	11.6	B	13.3	C	17.0	C	20.0
WB Left, Through & Right	E	35.1	F	886.5	F	77.4	F	550.1	F	1,524.7
NB Left, Through & Right	A	8.9	A	3.0	A	9.2	A	9.6	A	6.6
SB Left, Through & Right	A	8.0	A	0.7	A	8.3	A	8.6	A	0.9
SE North Bend Way/468th Ave SE										
EB Left & Right	C	16.8	C	19.4	C	23.0	E	45.8	F	204.3
NB Left & Through	A	8.6	A	3.2	A	8.9	A	9.3	C	15.1
I-90 WB Ramps/468th Ave SE										
WB Left, Through & Right	B	12.5	B	10.5	B	14.1	C	17.4	E	45.0
NB Left & Through	A	8.1	A	1.6	A	8.3	A	8.6	B	13.8
I-90 EB Ramps/468th Ave SE										
EB Left, Through & Right	C	15.5	A	7.6	C	22.0	F	67.0	B	12.9
SB Left & Through	A	8.0	B	12.8	A	8.1	A	8.3	C	23.4

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds calculated by HCS2000.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

Table 14-10
Alternative 2 PM Peak-Hour Level of Service Summary

Intersection	2005		2005 VISSIM		2015		2025		2025 VISSIM	
	LOS ^a	Delay ^b	LOS ^a	Delay ^c	LOS ^a	Delay ^b	LOS ^a	Delay ^b	LOS ^a	Delay ^c
SE 146th Street/468th Avenue SE										
EB Left, Through & Right	B	13.6	C	18.1	C	17.4	D	28.2	D	27.3
WB Left, Through & Right	D	26.9	F	148.8	E	48.2	F	204.3	F	806.4
NB Left, Through & Right	A	9.9	A	8.9	B	10.7	B	12.1	D	27.5
SB Left, Through & Right	A	7.8	A	0.5	A	8.0	A	8.3	A	0.7
SE North Bend Way/468th Ave SE										
EB Left & Right	C	18.2	D	29.9	D	30.1	F	193.5	F	816.7
NB Left & Through	A	8.6	B	10.1	A	9.1	A	9.9	F	57.2
I-90 WB Ramps/468th Ave SE										
WB Left, Through & Right	B	12.5	B	13.3	B	14.6	C	19.4	F	130.5
NB Left & Through	A	8.5	A	3.9	A	9.0	A	9.8	F	195.5
I-90 EB Ramps/468th Ave SE										
EB Left, Through & Right	D	32.4	C	16.3	F	214.6	F	>1,000	F	643.8
SB Left & Through	A	8.3	C	15.4	A	8.5	A	8.8	D	28.7

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds calculated by HCS2000.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

Table 14-11
Alternative 2 AM Peak-Hour Level of Service Comparison

Intersection	Existing	2005		2015		2025	
		Alt. 1	Alt. 2	Alt. 1	Alt. 2	Alt. 1	Alt. 2
SE 146th Street/468th Avenue SE							
EB Left, Through & Right	A	B	B	B	B	C	C
WB Left, Through & Right	B	C	E	C	F	E	F
NB Left, Through & Right	A	A	A	A	A	A	A
SB Left, Through & Right	A	A	A	A	A	A	A
SE North Bend Way/468th Ave SE							
EB Left & Right	B	B	C	C	C	D	E
NB Left & Through	A	A	A	A	A	A	A
I-90 WB Ramps/468th Ave SE							
WB Left, Through & Right	A	B	B	B	B	C	C
NB Left & Through	A	A	A	A	A	A	A
I-90 EB Ramps/468th Ave SE							
EB Left, Through & Right	B	B	C	C	C	E	F
SB Left & Through	A	A	A	A	A	A	A

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Table 14-12
Alternative 2 PM Peak-Hour Level of Service Comparison

Intersection	Existing	2005		2015		2025	
		Alt. 1	Alt. 2	Alt. 1	Alt. 2	Alt. 1	Alt. 2
SE 146th Street/468th Avenue SE							
EB Left, Through & Right	B	B	B	C	C	D	D
WB Left, Through & Right	B	C	D	E	E	F	F
NB Left, Through & Right	A	A	A	B	B	B	B
SB Left, Through & Right	A	A	A	A	A	A	A
SE North Bend Way/468th Ave SE							
EB Left & Right	B	C	C	D	D	F	F
NB Left & Through	A	A	A	A	A	A	A
I-90 WB Ramps/468th Ave SE							
WB Left, Through & Right	B	B	B	B	B	C	C
NB Left & Through	A	A	A	A	A	A	A
I-90 EB Ramps/468th Ave SE							
EB Left, Through & Right	C	D	D	F	F	F	F
SB Left & Through	A	A	A	A	A	A	A

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

All movements at the intersections along 468th Avenue SE (Exit 34) are expected to operate at a LOS D or better under Alternative 2 for the AM peak hour, with three exceptions: (1) the westbound left/through/right movement at SE 146th Street is projected to operate at LOS E by 2005 and LOS F by 2015, (2) the eastbound left/right movement at SE North Bend Way is projected to operate at LOS E in 2025, and (3) the eastbound left/through/right movement at the I-90 eastbound ramps is projected to operate at LOS F in 2025.

Under Alternative 2, 468th Avenue SE (Exit 34) would begin to reach capacity by 2005 during the PM peak hour. At the I-90 eastbound ramps, the eastbound left/through/right movement from the I-90 off-ramp to 468th Avenue SE would operate at LOS D by 2005 and LOS F by 2015. At SE 146th Street, the westbound left/through/right movement would begin to approach capacity by 2005 and operate at LOS E by 2015. By 2025, this movement would operate at LOS F. The eastbound left/right movement at SE North Bend Way is expected to operate at LOS D by 2015 and LOS F by year 2025.

The greatest impact from Alternative 2 during the AM peak hour would be the westbound left/through/right movement from the Lower Site at the intersection of SE 146th Street/468th Avenue SE. The approach would operate at LOS C under Alternative 1 in 2015 and LOS E under Alternative 2. In 2025, this movement is expected to operate at LOS E under Alternative 1 and is expected to operate at LOS F by 2025 under Alternative 2.

During the PM peak hour along 468th Avenue SE, the intersections at SE 146th Street, SE North Bend Way, and the I-90 eastbound ramps will all have movements that operate at LOS F with or without the Proposal in 2025. The additional traffic generated by the project would exacerbate the poor LOS because the addition of a few trucks on an over-capacity movement has a greater impact than that on an under capacity movement.

Queuing of project vehicles due to delays at the site, if any, can be accommodated on-site. Significantly more queuing space is available at the project site than on the approach roadways.

Traffic Safety

Additional truck traffic from the proposed project under Alternative 2, especially on 468th Avenue SE, would cause more conflicts or potential conflicts with other vehicles, pedestrians, bicycles, and school buses. The conflict areas of greatest safety concern are the right-turn movements into the Lower Site from 468th Avenue SE to SE 146th Street and the left turns from SE 146th Street onto 468th Avenue SE heading south to I-90. There are also concerns about additional vehicular traffic at the I-90 eastbound ramps and 468th Avenue SE intersection. This intersection would reach capacity by 2015 for the PM peak hour. Another area of concern is along 468th Avenue SE south of SE 146th Street to I-90, where truck traffic is not separated from pedestrians or bicyclists using the shoulder.

Pedestrian and Bicycle Travel

Although the Proposal is not projected to increase pedestrian or bicycle traffic, truck traffic along SE 146th Street and 468th Avenue SE would cross pedestrian and bicycle routes. Additional development along 468th Avenue SE and completion of two schools in the area would likely increase pedestrian and bicycle use.

School Transportation

Additional truck traffic from the Proposal would conflict with school traffic from the proposed elementary and middle schools traveling on 468th Avenue SE, turning at SE North Bend Way, and using the I-90 on/off ramps starting in 2005.

Weight Limits

The total full-truck weight could be up to 54 tons (almost the legal highway load limit for full trucks) leaving the gravel operation facility at SE 146th Street. Heavy truck traffic would shorten the life of road infrastructure, even that designed to carry heavy weights.

Interstate 90 Closures

When I-90 closes due to snowfall at Snoqualmie Pass or an accident, some of the eastbound truck traffic waits for the highway to reopen near

or at the Seattle East Auto Truck Plaza on 468th Avenue SE across from the Lower Site entrance. During these times, project-related traffic could conflict with additional non-project heavy-truck traffic, especially along 468th Avenue SE.

Public Services

The police, fire, and emergency services under this alternative would experience more conflicting traffic on 468th Avenue SE and at Exit 34.

14.3.2.3 Alternative 3—Lower and Upper Sites Mining - Exits 34 and 38 (Including Limited Lower Site Mining)

Trip Generation

Projected trip generation under Alternative 3 was prepared by Heffron Transportation using the same assumptions as for Alternative 2. The only difference in trip generation between Alternative 3 and Alternative 2 would be additional haul truck trips transporting aggregate from the Upper Site to the Lower Site because the conveyor would not be built. All trucks hauling aggregate would originate from the Upper Site, and all asphalt or concrete trucks would originate from the Lower Site. This would result in one gravel load generating four truck trips but only two trucks, two full and two empty—two using 468th Avenue SE (Exit 34) and two using SE Homestead Valley Road.

Trip Rates

Daily truck trip generation for the Alternative 3 were derived using the same methodology described for Alternative 2.

Figure 14-9 shows the Alternative 3 traffic movement to/from I-90 and SE 146th Street. Vehicles include trucks (aggregate, concrete, and asphalt) and passenger cars. Table 14-13 shows the number and type of vehicles as well as their direction (inbound or outbound from the site) that would be generated by Alternative 3 for an average day during the peak construction month. Assumptions regarding production are the same as for Alternative 2. Only the four intersections along 468th Avenue SE would experience slightly higher delays by the addition of project vehicles.

**Table 14-13
Project Trip Generation (Alternative 3)**

	Daily Trips (One-way)	AM Peak Hour Trips			PM Peak Hour Trips		
		In	Out	Total	In	Out	Total
Aggregate for Resupply ^a	568	24	36	60	6	4	10
Aggregate for Delivery ^a	152	6	10	16	2	1	3
Aggregate for Batch Plants ^b	118	6	6	12	1	1	2
Concrete	156	0	16	16	3	0	3
Asphalt	60	0	6	6	1	0	1
Total Truck Trips	1,054	36	74	110	13	6	19
Passenger Vehicle Trips	62	4	1	5	1	7	8
Total Trips	1,116	40	75	115	14	13	27

^a Aggregate for resupply and delivery is trucked from top of Grouse Ridge at the Upper Site.

^b Aggregate for batch plants is trucked from top of Grouse Ridge at the Upper Site to the Lower Site.

The trip generation table shows that Alternative 3 would generate 1,116 trips per day during the peak month. Total truck trips are higher in Alternative 3 than in the Proposed Alternative (Alternative 2) due to the aggregate for batch plants being trucked from the Upper Site to the Lower Site. Trip generation was not completed for Alternative 3A as this would generate fewer total trips. During the PM peak hour, the site would generate 27 trips a day during the peak month.

Trip Distribution Pattern and Assignment

Gravel extracted from the Lower Site would be transported from the site via SE 146th Street, 468th Avenue SE, and Exit 34, with the exception of product supplying local projects. After extraction has been completed in the Lower Site, the Upper Site would be developed and material hauled out using SE Grouse Ridge Road via I-90 at Exit 38. Aggregate processed at the Upper Site would also be hauled via Exit 38. The concrete and asphalt batch plants would be located at the Lower Site, and product generated in those plants would be hauled via Exit 34.

Future Traffic Volumes

Future forecasted traffic volumes under Alternative 3 were derived by adding project-generated volumes (see Figure 14-9) to the No Action forecasted volumes (see Figures 6 through 8 in Appendix M). The additional truck traffic on SE Grouse Ridge Road would increase to as high as two vehicles passing each other every minute during the peak hour.

Level of Service

Projected AM and PM peak-hour LOS and delays under Alternative 3 are presented in Table 14-14 and Table 14-15, respectively. Table 14-16 and Table 14-17 compares levels of service between Alternative 1 and Alternative 3.

Table 14-14
Alternative 3 AM Peak-Hour Level of Service Summary

Intersection	2005		2015		2025	
	LOS ^a	Delay ^b	LOS	Delay	LOS	Delay
SE 146th Street/468th Avenue SE						
EB Left, Through & Right	B	11.4	B	13.2	C	16.6
WB Left, Through & Right	C	24.4	E	38.2	F	87.2
NB Left, Through & Right	A	8.8	A	9.2	A	9.5
SB Left, Through & Right	A	8.0	A	8.3	A	8.6
SE North Bend Way/468th Ave SE						
EB Left & Right	C	15.8	C	19.7	D	32.8
NB Left & Through	A	8.6	A	8.7	A	9.0
I-90 WB Ramps/468th Ave SE						
WB Left, Through & Right	B	11.9	B	13.3	C	16.2
NB Left & Through	A	8.0	A	8.2	A	8.5
I-90 EB Ramps/468th Ave SE						
EB Left, Through & Right	B	14.0	C	18.9	E	40.7
SB Left & Through	A	7.9	A	8.0	A	8.2

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds as calculated by HCS2000.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

Table 14-15
Alternative 3 PM Peak-Hour Level of Service Summary

Intersection	2005		2015		2025	
	LOS ^a	Delay ^b	LOS	Delay	LOS	Delay
SE 146th Street/468th Avenue SE						
EB Left, Through & Right	B	13.3	C	17.4	D	27.7
WB Left, Through & Right	C	23.4	E	41.6	F	141.7
NB Left, Through & Right	A	9.6	B	10.7	B	11.8
SB Left, Through & Right	A	8.0	A	8.0	A	8.2
SE North Bend Way/468th Ave SE						
EB Left & Right	C	18.0	D	29.3	F	174.7
NB Left & Through	A	8.6	A	9.1	A	9.8
I-90 WB Ramps/468th Ave SE						
WB Left, Through & Right	B	12.3	B	14.3	C	18.7
NB Left & Through	A	8.5	A	9.0	A	9.8
I-90 EB Ramps/468th Ave SE						
EB Left, Through & Right	D	29.8	F	177.8	F	>1,000
SB Left & Through	A	8.2	A	8.4	A	8.6

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

Table 14-16
Alternative 3 AM Peak-Hour Level of Service Comparison

Intersection	Existing	2005		2015		2025	
		Alt. 1	Alt. 3	Alt. 1	Alt. 3	Alt. 1	Alt. 3
SE 146th Street/468th Avenue SE							
EB Left, Through & Right	A	B	B	B	B	C	C
WB Left, Through & Right	B	C	C	C	E	E	F
NB Left, Through & Right	A	A	A	A	A	A	A
SB Left, Through & Right	A	A	A	A	A	A	A
SE North Bend Way/468th Ave SE							
EB Left & Right	B	B	C	C	C	D	D
NB Left & Through	A	A	A	A	A	A	A
I-90 WB Ramps/468th Ave SE							
WB Left, Through & Right	A	B	B	B	B	C	C
NB Left & Through	A	A	A	A	A	A	A
I-90 EB Ramps/468th Ave SE							
EB Left, Through & Right	B	B	B	C	C	E	E
SB Left & Through	A	A	A	A	A	A	A

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.
EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Table 14-17
Alternative 3 PM Peak-Hour Level of Service Comparison

Intersection	Existing	2005		2015		2025	
		Alt. 1	Alt. 3	Alt. 1	Alt. 3	Alt. 1	Alt. 3
SE 146th Street/468th Avenue SE							
EB Left, Through & Right	B	B	B	C	C	D	D
WB Left, Through & Right	B	C	C	E	E	F	F
NB Left, Through & Right	A	A	A	B	B	B	B
SB Left, Through & Right	A	A	A	A	A	A	A
SE North Bend Way/468th Ave SE							
EB Left & Right	B	C	C	D	D	F	F
NB Left & Through	A	A	A	A	A	A	A
I-90 WB Ramps/468th Ave SE							
WB Left, Through & Right	B	B	B	B	B	C	C
NB Left & Through	A	A	A	A	A	A	A
I-90 EB Ramps/468th Ave SE							
EB Left, Through & Right	C	D	D	F	F	F	F
SB Left & Through	A	A	A	A	A	A	A

Note: Only Critical Movements shown. Those movements with free-flow through intersection are not represented here.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

All movements at intersections along 468th Avenue SE (Exit 34) would continue to operate at LOS C or better under Alternative 3 for the AM peak hour, with the exception of the westbound left/through/right movement at SE 146th Street. This movement would operate at LOS D in 2015 and LOS E in 2025. All four Exit 38 ramp intersections are

underutilized and would not experience additional adverse delays due to the proposed project in either the AM or PM peak hour.

As indicated on Table 14-15, intersections at 468th Avenue SE under Alternative 3 would begin to reach capacity during the PM peak hour by 2015. The eastbound left/through/right movement at the I-90 eastbound ramps (Exit 34) are projected to operate at LOS F by 2015. The westbound left/through/right movement at SE 146th Street is projected to approach capacity by 2015 and operate at LOS E, and then operate at LOS F by 2025. The eastbound left/right movement at SE North Bend Way is expected to operate at LOS F by 2025. All four I-90 Exit 38 ramp intersections at SE Homestead Valley Road are underutilized and would not experience additional adverse delays due to the proposed project.

The greatest impact during the AM peak hour from Alternative 3 traffic would be at the westbound approach to the intersection of SE 146th Street with 468th Avenue SE during year 2015. The approach would operate at LOS F under Alternative 3, compared with LOS C under the No Action Alternative 1. In 2025, this movement (westbound at 468th Avenue SE/146th Avenue SE) degrades to LOS E in Alternative 1 and remains at LOS F (with more congestion) in Alternative 3. Additionally, in 2025 the eastbound movements of SE North Bend Way degrade from a LOS D in Alternative 1 to LOS E in Alternative 3. Further, in 2025, the eastbound movements at I-90 Eastbound ramps and 468th Avenue SE degrade from LOS E in Alternative 1 to LOS F in Alternative 3.

The greatest impact during the PM peak hour from Alternative 3 traffic would be at the eastbound approach to the intersection of the eastbound I-90 ramps with 468th Avenue SE during the study year 2015 and 2025. The approach at the off-ramp would operate at LOS F under Alternative 3 (the same as Alternative 1). Additionally, the westbound movements at SE 146th Street and 468th Avenue SE in 2015 are projected to operate at LOS E under both Alternatives 1 and 3. Further, traffic at intersections along 468th Avenue SE at SE 146th Street and SE North Bend Way would also operate at LOS F by 2025 under both Alternatives 1 and 3. Additional trucks at these intersections under Alternative 3 would increase the severity of the poor LOS.

Queuing of project vehicles due to delays at the site, if any, can be accommodated on-site. Significantly more queuing space is available at the project site than on the approach roadways.

Traffic Safety

When the Lower Site is mined, traffic safety impacts on 468th Avenue SE would be similar to those resulting from Alternative 2.

Traffic safety impacts for the Upper Site and SE Grouse Ridge Road would include passing roadway traffic, potential bottlenecks at the one-lane bridge, steep slopes off the sides of the roadway, tight roadway

turns, and limited sight distance. There also would be additional truck traffic on SE Homestead Valley Road, which has two narrow bridges and leads to the entrance to Olallie State Park. Truck traffic in and out of the Upper Site would conflict with pedestrian and bicycle traffic on SE Homestead Valley Road. Additional conflicts with pedestrian and bicycle recreation traffic could occur along SE Homestead Valley Road, especially during summer when Olallie State Park is at maximum use and the demand for construction material would be high.

Pedestrian and Bicycle Travel

Although Alternative 3 is not projected to increase pedestrian and bicycle traffic, truck traffic in and out of the Lower Site during operation would conflict with pedestrian and bicycle traffic along SE 146th Street and 468th Avenue SE. Additional pedestrian and bicycle travel along 468th Avenue SE would likely increase as the proposed elementary school and middle schools open (projected for 2005 for this traffic analysis). Truck traffic in and out of the Upper Site would conflict with pedestrian and bicycle traffic on SE Homestead Valley Road, especially near the entrance to Olallie State Park.

School Transportation

Impacts would be similar to those from Alternative 2 along 468th Avenue SE. Traffic from the Upper Site also may conflict with school bus traffic on SE Homestead Valley Road.

Weight Limits

Total truck weights could be up to 54 tons (almost the legal highway load limit for full trucks) leaving the Lower Site at SE 146th Street. Heavy truck traffic would shorten the life of all infrastructure; this is especially true for bridges such as the SE Grouse Ridge Road bridge over the South Fork of the Snoqualmie River. The bridge superstructure (girders and roadway deck) would need to be monitored for increased deterioration. Only one loaded truck would be able to cross the bridge at a time in order to stay under weight limits.

Interstate 90 Closures

Impacts would be similar to those described for Alternative 2 along 468th Avenue SE. In addition, the closure of I-90 could cause extreme overflow conditions, and trucks also could be directed to the military's convoy staging locations along SE Homestead Valley Road because Exit 38 would have to remain open for the proposed project operation. Conflicts with gravel trucks accessing the Upper Site via Exit 38 and SE Homestead Valley Road could occur. Though Exit 38 and SE Homestead Valley Road would likely remain open during I-90 closures and be useable for gravel trucks accessing the Upper Site, traffic would likely slow due to congestion and snow/ice conditions.

Public Services

The police, fire, and emergency services under this alternative would experience more conflicting traffic on 468th Avenue SE and at Exit 34. They would also experience more conflicting traffic along Homestead Valley Road and at the Exit 38 interchanges. The non-emergency police and fire traffic traveling to the Washington State Patrol Fire Training Academy on SE Grouse Ridge Road would experience a multiple increase in conflicting traffic on the one-lane roadway, though total traffic would still be less than 1,000 vehicles per day.

14.3.2.4 Alternative 4—Upper Site Mining - Exit 38

Trip Generation

The projected trip generation under Alternative 4 prepared by Heffron Transportation assumes that, initially, the Upper Site would be used to supply direct sales of unprocessed materials to customers and other Cadman, Inc. facilities. The Lower Site would not be excavated or developed. At its peak, the Upper Site is expected to produce up to 2.1 million tons of gravel each year and employ approximately 17 people at full production.

Fewer trips would be generated under Alternative 4 than Alternatives 2 or 3 because it would not include the asphalt or concrete batch plants. All truck traffic would originate from the Upper Site. Because aggregate would not be used for asphalt or concrete production, more aggregate would be trucked offsite.

Trip Rates

Refer to the methodology used to determine trip generation described for Alternative 2. Under Alternative 4, vehicles traveling to/from I-90 would use Exit 38 only. Minimal to no adverse traffic impacts at Exit 38 would occur at ramp intersections. Table 14-18 shows the number and type of vehicles as well as their direction (inbound or outbound from the site) that would be generated by Alternative 4 for an average day during the peak construction month using SE Grouse Ridge Road and Exit 38 (Homestead Valley Road).

**Table 14-18
Alternative 4 Project Trip Generation**

	Daily Trips (one-way)	AM Peak Hour Trips			PM Peak Hour Trips		
		In	Out	Total	In	Out	Total
Aggregate for Resupply	568	24	36	60	6	4	10
Aggregate for Delivery	318	13	20	33	3	2	5
Aggregate for Batch Plants	0	0	0	0	0	0	0
Concrete	0	0	0	0	0	0	0
Asphalt	0	0	0	0	0	0	0
Total Truck Trips	886	37	56	93	9	6	15
Passenger Vehicle Trips	52	3	1	4	1	6	7
Total Trips	938	40	57	97	10	12	22

The above trip generations show that Alternative 4 would generate 938 trips per day during the peak month. During the PM peak hour, the site would generate 22 trips a day during the peak month.

Trip Distribution Pattern and Assignment

Under Alternative 4, extraction and aggregate processing would occur at the Upper Site only, with processed material hauled out via SE Grouse Ridge Road and Homestead Valley Road to Exit 38.

Future Volumes

All four Exit 38 ramp intersections are underutilized and would not experience adverse delays or change in levels of service due to the project. The additional truck traffic on SE Grouse Ridge Road and Homestead Valley Road would increase to as high as two vehicles passing each other every minute during the peak hour.

Level of Service

All four I-90 ramp intersections at Exit 38 would continue to operate at LOS A in 2025. Alternative 4 would not impact Exit 32 or Exit 34. These two exits would operate the same as under Alternative 1. The major LOS impact would be on SE Grouse Ridge Road and its bridge over the South Fork of the Snoqualmie River.

Traffic Safety

Under Alternative 4, all safety concerns would be similar to Alternative 3, but traffic impacts would be more intense and felt sooner. SE Grouse Ridge Road is a one-lane, 14-foot-wide, 2.5-mile road with some turnouts and would become the principal access to the Upper Site. Truck traffic from the proposed project would be passing by and conflicting with Fire Training Academy traffic. There would be a potential for bottlenecks and collisions where two vehicles meet, especially where there are roadway sight-distance problems. If traffic leaves the roadway to allow other traffic to pass, the steep slopes and trees off the road side, drainage

swales, and limited sight distance would hamper safe vehicle return to the roadway. The one-lane bridge across the South Fork of the Snoqualmie River would be another safety concern. Safety issues on SE Homestead Valley Road would be similar to those discussed for Alternative 3.

Pedestrian and Bicycle Travel

Although Alternative 4 is not projected to increase pedestrian and bicycle traffic, truck traffic in and out of the Upper Site would conflict with pedestrian and bicycle traffic on SE Homestead Valley Road. Impacts would be similar to, although likely greater than, those for Alternative 3 along SE Homestead Valley Road because this route would be used for the duration of the project.

School Transportation

Truck traffic from mining at the Upper Site would likely conflict with the school traffic generated from the future schools off 468th Avenue SE and existing district schools in the City of North Bend. School traffic would travel on SE Homestead Valley Road and onto I-90 Exits 38 and 34 on/off ramps.

Weight Limits

Impacts of heavy trucks would be similar to those described for Alternative 3.

Interstate 90 Closures

Impacts would be similar to those described for Alternative 3.

Public Services

The non-emergency police and fire traffic traveling to the Washington State Patrol Fire Training Academy on SE Grouse Ridge Road would experience a multiple increase in conflicting traffic on the one-lane roadway, though total traffic would still be less than 1,000 vehicles per day.

14.3.3 Cumulative Impacts

14.3.3.1 Alternatives 2, 3, and 4

Cumulative transportation impacts under Alternatives 2, 3, and 4 should be viewed in terms of localized and regional growth in traffic. Alternative 2 would likely accelerate the need to improve 468th Avenue SE from I-90 Exit 34 to SE 146th Street. Alternatives 3 and 4 would likely accelerate the need to improve SE Homestead Valley Road.

14.4 Mitigation Measures

14.4.1 Alternative 1–No Action

No mitigation measures are proposed under Alternative 1. The intersection of 468th Avenue SE and the I-90 eastbound ramps will function at LOS F in the PM peak hour by 2015. A traffic signal may be required to mitigate the LOS F for the I-90 eastbound ramps at 468th Avenue SE (Exit 34).

14.4.2 Alternative 2–Lower and Upper Sites Mining (Including Limited Lower Site Mining)

The traffic analysis of the proposed project shows operational failure (LOS E and F) in both the AM peak and PM peak hour for one movement by 2005 and for additional movements by 2015 and 2025. A traffic model (VISSIM) was developed (see Attachment A to Appendix M) to test mitigation alternatives. Mitigation alternatives were tested to in an effort to improve the operational LOS and to reduce the queue lengths. These model runs simulated future conditions with varying levels of mitigation during the AM and PM peak hours. Simulations scenarios included:

- Scenario 1: Existing traffic modeled to calibrate the VISSIM model
- Scenario 2: Projected 2005 and 2025 traffic volumes modeled on the existing street system
- Scenario 3: Projected 2005 and 2025 traffic volumes, including the project-generated vehicle volumes on the existing street system with no mitigation
- Scenario 4: Projected 2005 and 2025 traffic volumes, including the project-generated vehicle volumes, modeled with a three lane (Two-way left turn lane), on 468th Avenue SE and a turn pocket added to eastbound SE North Bend Way at the intersection with 468th Avenue SE.
- Scenario 5: Projected 2005 and 2025 traffic volumes, including the projected generated vehicle volumes, modeled with a three lane (Two-way left turn lane), on 468th Avenue SE and a turn pocket added to eastbound SE North Bend Way at the intersection with 468th Avenue SE. Also included in this model is a signal at SE 146th Street and 468th Avenue SE.

Tables 14-19 and 14-20 indicate the AM and PM peak hour LOS and Delay for both the HCS and VISSIM modeling as well as the queue lengths generated by the VISSIM model for the mitigation associated with Scenario 4, widening of 468th Avenue SE and SE North Bend Way.

Table 14-19
Scenario 4 AM Peak-Hour Level of Service Summary
Mitigation on Alternative 2 Including TWLTL and Signal at I-90 EB Ramps

Intersection	2005		2005 VISSIM			2015		2025		2025 VISSIM		
	LOS ^a	Delay ^b	LOS	Delay	Queue Length	LOS	Delay	LOS	Delay	LOS	Delay	Queue Length
SE 146th Street/468th Avenue SE												
EB Left, Through & Right	B	10.5	A	10.0	46	B	11.9	C	16.5	B	12.5	62
WB Left, Through & Right	C	17.6	F	570.8	1,841	D	30.4	F	456.2	F	1,430.2	2,677
NB Left	A	8.9	A	6.3	141	A	9.2	A	9.6	B	11.1	187
SB Left	A	8.0	A	7.7	0	A	8.3	A	8.6	A	6.9	30
SE North Bend Way/468th Ave SE												
EB Left	B	12.7	D	29.3	95	C	17.7	C	22.7	F	139.3	417
EB Right	B	11.0	A	7.3	69	B	11.7	B	12.8	C	16.0	69
NB Left	A	8.6	A	4.8	121	A	8.9	A	9.3	A	7.3	125
I-90 WB Ramps/468th Ave SE												
WB Left, Through & Right	B	12.3	B	10.2	102	B	13.9	C	16.8	C	15.6	89
NB Left	A	8.1	A	8.1	39	A	8.3	A	8.6	C	15.7	59
I-90 EB Ramps/468th Ave SE												
EB Left, Through & Right	B	13.1	A	6.8	157	C	24.4	B	17.3	B	12.2	272
NB Through & Right	B	14.6	A	9.0	56	C	21.6	B	15.6	B	11.7	66
SB Left	D	41.2	B	14.9	92	C	21.0	F	102.2	B	19.6	131
SB Through	B	13.6	B	11.0	23	B	14.1	B	13.8	B	12.9	23

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

^d Queue Length = 95% maximum length of vehicles waiting to make a movements from VISSIM model calculations measured in feet.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only critical movements were represented in this table. Other movements have minimal to no delay.

Table 14-20
Scenario 4 PM Peak-Hour Level of Service Summary
Mitigation on Alternative 2 Including TWLTL and Signal at I-90 EB Ramps

Intersection	2005		2005 VISSIM			2015		2025		2025 VISSIM		
	LOS ^a	Delay ^b	LOS	Delay	Queue Length	LOS	Delay	LOS	Delay	LOS	Delay	Queue Length
SE 146th Street/468th Avenue SE												
EB Left, Through & Right	B	11.8	B	12.8	56	B	14.3	D	26.1	F	76.6	210
WB Left, Through & Right	C	15.2	F	58.0	112	C	24.8	F	155.6	F	1,863.2	1,237
NB Left	A	9.9	B	13.8	259	B	10.7	B	12.1	F	82.8	2,165
SB Left	A	7.8	A	1.5	0	A	8.0	A	8.3	A	1.6	0
SE North Bend Way/468th Ave SE												
EB Left	B	12.5	D	33.3	69	C	18.3	D	25.4	F	1,002.1	2,113
EB Right	B	12.1	A	7.7	69	B	13.9	C	17.4	F	561.6	69
NB Left	A	8.6	A	7.8	43	A	9.1	A	9.9	A	9.5	125
I-90 WB Ramps/468th Ave SE												
WB Left, Through & Right	B	11.8	B	10.3	102	B	13.7	C	16.8	F	371.6	1,512
NB Left	A	8.5	B	14.0	59	A	9.0	A	9.8	F	55.2	112
I-90 EB Ramps/468th Ave SE												
EB Left, Through & Right	C	20.1	B	13.3	243	C	20.7	C	32.2	F	104.9	1,670
NB Through & Right	B	11.0	A	9.3	49	C	31.3	B	12.2	D	38.4	118
SB Left	F	187.7	B	15.2	157	D	47.4	F	459.8	C	22.3	217
SB Through	B	11.0	A	10.0	46	B	14.5	B	12.4	B	11.6	66

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

^d Queue Length = 95% maximum length of vehicles waiting to make a movements from VISSIM model calculations measured in feet.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only critical movements were represented in this table. Other movements have minimal to no delay.

Tables 14-21 and 14-22 indicate the AM and PM peak hour LOS and Delay for both the HCS and VISSIM modeling as well as the queue lengths generated by the VISSIM model for the mitigation associated with Scenario 5, widening of 468th Avenue SE, widening SE North Bend Way, and providing a signal at 468th Avenue SE and SE 146th Street.

Table 14-21
Scenario 5 AM Peak-Hour Level of Service Summary
Mitigation on Alternative 2 Including TWLTL and Signals at I-90 EB Ramps and 146th Street

Intersection	2005		2005 VISSIM			2015		2025		2025 VISSIM		
	LOS ^a	Delay ^b	LOS	Delay	Queue Length	LOS	Delay	LOS	Delay	LOS	Delay	Queue Length
SE 146th Street/468th Avenue SE												
EB Left, Through & Right	B	15.7	B	13.2	39	B	16.0	B	17.4	C	34.5	69
WB Left, Through & Right	C	23.1	B	18.5	98	C	23.9	C	24.4	C	34.2	164
NB Left	A	5.8	B	11.7	108	B	10.8	B	15.0	B	16.4	194
NB Through & Right	B	11.6	A	8.3	151	B	13.3	B	18.1	A	9.1	197
SB Left	A	7.5	B	14.6	0	A	7.6	A	9.0	C	29.1	20
SB Through & Right	B	10.3	B	10.9	164	B	11.2	B	14.2	B	17.0	282
SE North Bend Way/468th Ave SE												
EB Left	B	12.7	C	24.9	69	C	17.7	C	22.7	F	141.5	476
EB Right	B	11.0	B	8.3	69	B	11.7	B	12.8	D	27.8	69
NB Left	A	8.6	A	4.3	125	A	8.9	A	9.3	A	6.0	125
I-90 WB Ramps/468th Ave SE												
WB Left, Through & Right	B	12.3	B	10.3	89	B	13.9	C	16.8	C	16.6	151
NB Left	A	8.1	B	10.7	39	A	8.3	A	8.6	C	18.5	59
I-90 EB Ramps/468th Ave SE												
EB Left, Through & Right	B	13.1	A	7.2	161	C	24.4	B	17.3	B	11.3	236
NB Through & Right	B	14.6	A	8.8	49	C	21.6	B	15.6	B	12.3	85
SB Left	D	41.2	B	13.6	89	C	21.0	F	102.2	C	21.7	131
SB Through	B	13.6	A	8.9	23	B	14.1	B	13.8	B	11.8	39

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

^d Queue Length = 95% maximum length of vehicles waiting to make a movements from VISSIM model calculations measured in feet.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only critical movements were represented in this table. Other movements have minimal to no delay.

Table 14-22
Scenario 5 PM Peak-Hour Level of Service Summary
Mitigation on Alternative 2 Including TWLTL and Signals at I-90 EB Ramps and 146th Street

Intersection	2005		2005 VISSIM			2015		2025		2025 VISSIM		
	LOS ^a	Delay ^b	LOS	Delay	Queue Length	LOS	Delay	LOS	Delay	LOS	Delay	Queue Length
SE 146th Street/468th Avenue SE												
EB Left, Through & Right	B	17.5	B	12.0	49	B	17.9	C	21.7	B	12.9	66
WB Left, Through & Right	B	17.4	B	18.3	72	B	17.7	C	21.3	C	23.6	92
NB Left	B	12.4	A	7.6	89	C	20.1	D	35.1	B	14.9	239
NB Through & Right	A	9.1	A	2.4	92	B	10.5	A	9.0	A	3.3	141
SB Left	A	6.6	A	6.6	0	A	6.6	A	5.3	B	14.6	16
SB Through & Right	B	11.1	A	7.8	161	B	13.5	B	13.6	B	13.2	306
SE North Bend Way/468th Ave SE												
EB Left	B	12.5	C	18.3	43	C	18.3	D	25.4	F	109.7	233
EB Right	B	12.1	A	8.6	69	B	13.9	C	17.4	B	12.6	92
NB Left	A	8.6	A	3.6	33	A	9.1	A	9.9	A	8.3	59
I-90 WB Ramps/468th Ave SE												
WB Left, Through & Right	B	11.8	B	11.4	108	B	13.7	C	16.8	C	16.9	151
NB Left	A	8.5	A	9.9	56	A	9.0	A	9.8	C	19.8	82
I-90 EB Ramps/468th Ave SE												
EB Left, Through & Right	C	20.1	B	12.3	256	C	20.7	C	32.2	D	37.9	692
NB Through & Right	B	11.0	A	9.0	46	C	31.3	B	12.2	B	15.6	69
SB Left	F	187.7	B	15.7	161	D	47.4	F	459.8	C	25.2	233
SB Through	B	11.0	A	9.7	49	B	14.5	B	12.4	B	11.8	85

^a LOS = Level of Service.

^b Delay = Average delay per vehicle in seconds.

^c Delay = Average delay per vehicle in seconds based on VISSIM model calculations

^d Queue Length = 95% maximum length of vehicles waiting to make a movements from VISSIM model calculations measured in feet.

EB = eastbound, WB = westbound, NB = northbound, SB = southbound

Note: Only critical movements were represented in this table. Other movements have minimal to no delay.

The model results indicate that widening 468th Avenue SE to three lanes and providing a left turn pocket on SE North Bend Way at the intersection with 468th Avenue SE (Scenario 4) does little to improve the LOS throughout the study area for the AM and PM peak periods. Most of the delay and queuing during the PM peak period result from traffic other than that generated by the mining operation (see Appendix M).

Model results for Scenario 5 (widening 468th Avenue SE, providing a turn pocket on SE North Bend Way at the intersection with 468th Avenue SE, and signaling the intersection of 468th Avenue SE and SE 146th Street) vastly improves the LOS and delay while reducing queue lengths throughout the project area. All movements in the year 2005 operate at LOS D or better for both the AM and PM peak hours with the exception of the southbound left at 468th Avenue SE and the I-90 eastbound ramps. Modifications to the signal timing would likely improve this level of service.

Signalization of the intersection of 468th Avenue SE and SE 146th Street would reduce delay for westbound left turns in the AM peak from 1,524.7 seconds to 34.2 seconds, improve the LOS for the westbound approach from F to C, and reduce the queue length on the westbound approach to 164 feet. Although there would be lower volumes exiting the mining operation during the PM peak, traffic on the westbound approach would be delayed significantly by conflicting heavy traffic volumes on SE 468th Avenue. Scenario 5 mitigation would reduce delay on this approach from 806.4 seconds to 23.6 seconds, improve the LOS for westbound approach from F to C, and reduce the queue length on the westbound approach to 92 feet.

The intersection of SE 468th Avenue at SE North Bend Way would operate at an LOS F with or without the project. However, with Scenario 5 mitigation including adding a turn pocket on SE North Bend Way, the delay for the eastbound left turn would be decreased from 173.2 seconds in the AM peak hour to 141.5 seconds. In the PM peak hour, the same Scenario 5 mitigation would decrease delay from 1061.8 seconds to 109.7 seconds. The queue length on the eastbound approach would be reduced to 476 feet in the AM peak and 233 feet in the PM peak.

With the Scenario 5 mitigation, improved traffic flow would result in increased gaps in traffic for northbound left turns and all westbound movements at the I-90 westbound ramps during the PM period. Delay would be reduced for northbound left turns from 195.5 seconds to 19.8 seconds, and from 130.5 seconds to 16.9 seconds for westbound left/right turns. LOS would be improved from F to C. In addition, the queue length would be reduced on the northbound approach from 82 feet and to 151 feet on the westbound approach.

With traffic flow increased on 468th Avenue SE, the traffic flow from I-90 eastbound to northbound 468th Avenue SE also would increase during the PM peak period. Delay for eastbound left turns would be reduced from 643.8 seconds to 37.9 seconds with the Scenario 5 mitigation. Correspondingly, the LOS would improve from F to D and queue length would be reduced to 692 feet.

The capacity analysis shows that major roadway improvements are not, and would not be, warranted along 468th Avenue SE based on the proposed project traffic volume. For safety and operational reasons, some improvements may be warranted to ease the everyday congestion that would occur at the access to the proposed site. Widening 468th Avenue SE to provide a center, two-way left-turn lane at this location would improve truck turning conditions by allowing through traffic to bypass queued vehicles turning in and out of the Lower Site and/or the Seattle East Auto Truck Plaza. Mitigation measures proposed for this improvement include the following and should be in place prior to mining operations that include aggregate hauling:

- Widen 468th Avenue SE to three lanes from the I-90 eastbound ramps through the intersection of SE 146th Street/Seattle East Auto Truck

Plaza driveway. The transition from three to two lanes should begin to the north of SE 146th Street and end near the north gate of Seattle East Auto Truck Plaza. Future development could continue the left-turn lane farther north when warranted. An 8-foot shoulder or curb, gutter, and sidewalk should be provided along the outside edge of the north- and southbound lanes for emergency parking/access and bicycle and pedestrian use.

- Installation of a traffic signal at SE 146th Street and 468th Avenue SE intersection has been identified as a reasonable mitigation measure to reduce the LOS at this intersection to below FOS F, an acceptable level under County Code. A warrant analysis was performed for each of the three design years and is included as an attachment to the Transportation Technical Report. The warrant analysis revealed that a signal is not warranted, however, based on the significant improvement in the level of service and the reduction in queue lengths throughout the project area, a signal is recommended. While installation of the signal would not otherwise be required under County standards at this time, SEPA provides permit decisionmakers with authority to require reasonable measures to mitigate significant adverse environments impacts. Such SEPA mitigation authority extends even beyond those standards that would otherwise be required under a strict application of County Code.
- Require a truck turning template analysis in the southeast corner of the intersection of 468th Avenue SE and SE 146th Street by the Edgewick Inn during permitting.
- The permit should additionally include provisions requiring that the applicant continue to monitor future conditions along the corridor of 468th Avenue SE between I-90 eastbound ramps and SE 144th Street. This monitoring should provide updated operational analysis of the corridor for the life of the Proposal. In the event that the County determines as part of its five-year periodic review processes, that future Project-related conditions warrant alternative mitigation measures, such as a right-turn lane on SE North Bend Way at 468th Avenue SE, potential signalization of the I-90 eastbound ramps or reevaluation of the signal location at 468th Avenue SE and SE 146th Street, Cadman, Inc. should be required to either construct or contribute to the construction of such measures.
- Complete installation of an 8-foot-wide paved shoulder along 468th Avenue SE from the I-90 ramps to SE North Bend Way.
- Improve signs and pavement marking at existing crossing locations on 468th Avenue SE and SE 146th Street, as necessary.
- Install continuous illumination from I-90 Exit 34 through the required channelization improvements along 468th Avenue SE.
- Restrict truck traffic from the Lower Site to use only SE 146th Street and 468th Avenue SE between SE 146th Street and the I-90 Exit 34 ramps, with the exception of trucks making local deliveries.
- Pay MPS fees for King County planned improvement projects.

Implementation of the improvements described above, including the left-turn lane and widening of the shoulders would eliminate blockage caused by trucks waiting to turn into Seattle East Auto Truck Plaza and out of the project site onto 468th Avenue SE. This widening would also allow room for vehicles to pull out of the way of emergency vehicles or for emergency services to bypass congested areas. Installing a traffic signal in the future at the intersection of 468th Avenue SE and the I-90 eastbound off-ramp would improve the LOS from LOS F to LOS D by year 2025. Other safety improvements that should be evaluated and implemented by others, if justified, include:

- Lower the speed limit along 468th Avenue SE to a consistent 25 mph between SE North Bend Way and SE Middle Fork Road.
- Post “No Parking” signs along 468th Avenue SE segments that are occasionally used for truck parking and when I-90 is closed.

Construction traffic impacts could be reduced and minimized by the following:

- Establishing construction periods, typically during daytime hours on weekdays only
- Designating appropriate truck/hauling routes to/from the project site
- Regular sweeping and washing operations on highways and streets along truck haul routes
- Using native, onsite material to minimize the amount of offsite truck hauling of excavated and fill material
- Permitting oversize loads to/from the site in accordance with King County and WSDOT regulations as to time and procedure, loading, and bridge use.

14.4.3 Alternative 3—Lower and Upper Sites Mining (Including Limited Lower Site Mining)

Mitigation for Alternative 3 should include all the improvements along 468th Avenue SE as proposed for Alternative 2. In addition, improvements to SE Grouse Ridge Road and the operation of the bridge would be needed for project operations (see Figure 14-10). As a primary local user of SE Homestead Valley Road, the project should also contribute to improvements to bring this roadway up to current King County road standards. A summary of these proposed mitigation improvements include:

- Because SE Grouse Ridge Road is too narrow for safe truck traffic operations in both directions in most locations, the roadway should be widened to two lanes following King County standards to permit truck traffic in both directions. Figure 14-10 shows a sketch of the roadway and illustrates the approximate locations that would need improving, which includes some realignment to remove blind spots.

- If agreed upon by the local private parties that own and use SE Grouse Ridge Road, the existing bridge over the South Fork of the Snoqualmie River (owned by the State Patrol Fire Academy/State police) could remain as a one-way operation. Only one truck should be allowed on the bridge at a time. Stop signs and bridge signage would be installed to minimize deterioration of the existing bridge superstructure. Otherwise, to accommodate two lanes of traffic, a new bridge parallel to the old one at 0.2 mile would likely need to be built.

Environmental issues associated with a second bridge would require additional analysis. The road on the north/west/uphill end of the bridge should be realigned and sight distance improved. Fills and blasting of rock in several locations would be necessary to widen the road. Blind curves along the road and approaching the bridge would have to be straightened to improve safety. To accommodate trucks, many trees and branches would need to be removed.

- The remaining section of SE Homestead Valley Road should be widened for shoulders and a pavement overlay would be finished. This would support truck volumes and provide safe passage of pedestrian and bicycle traffic conflicting with proposed truck traffic. Rehabilitation of the roadway structure over a 10- to 20-year period would need to be agreed upon but would likely include repair of existing concrete panels. Non-destructive *in-situ* testing, pavement coring, and laboratory testing would provide better information and an increased level of confidence in future roadway performance predictions. Mitigation should include safety improvements to two small bridges over creeks that cross under this section of SE Homestead Valley Road.

14.4.4 Alternative 4—Upper Site Mining - Exit 38

The same mitigation improvements as noted under Alternative 3 and as shown in Figure 14-10 should be required for SE Grouse Ridge Road, Exit 38-SE Homestead Valley Road, and their respective bridges. No improvements would be required along or in the area of 468th Avenue SE including I-90 Exit 34.

14.5 Significant Unavoidable Adverse Impacts

All significant measurable adverse transportation impacts could and would be mitigated by the above measures. The FEIS has concluded that under Alternative 2 (the preferred alternative), by 2005, the westbound leg of the SE 146th Street and 468th Avenue SE intersection would be operating at LOS F. Under County Code, the change to LOS F is deemed to be a significant adverse environment impact. Installation of a traffic signal at the intersection of SE 146th Street and 468th Avenue SE has been identified within this FEIS as a reasonable mitigation measure to reduce the LOS at this intersection to below LOS F, an acceptable level under County Code. While installation of the signal would not otherwise be required under County standards at this time, SEPA provides permit

decisionmakers with authority to require reasonable measures to mitigate significant adverse environmental impacts. Such SEPA mitigation authority extends even beyond those standards that would otherwise be required under a strict application of County Code.

For County roads (such as 468th Avenue SE and SE Homestead Valley Road) and State roads (I-90 interchanges), mitigation measures for the proposed project would be accomplished by either making payments of applicable traffic impact fees and/or implementing access and public road improvements in the project area. Mitigation of traffic impacts on the City of North Bend street system could be accomplished by negotiating a voluntary road improvement or fee payment agreement with the City and County, drawing from the suggestions provided above in Section 14.3, Mitigation Measures. No significant unavoidable adverse project-related impacts from transportation are expected.